Figure 1

Figure 2

G.711
G.723.1
GSM 06.10

HPLMN_a

HLR

VPLMN_a

BSS
MSC
GW

20

added delay

Added transcoding

transcoding

24

VoIP Homing leg

22

transcoding

26

GW

added delay

32

VoIP Roaming leg

GW

GMSC

HLR

28

30

added transcoding

HPLMN_b

VPLMN_b
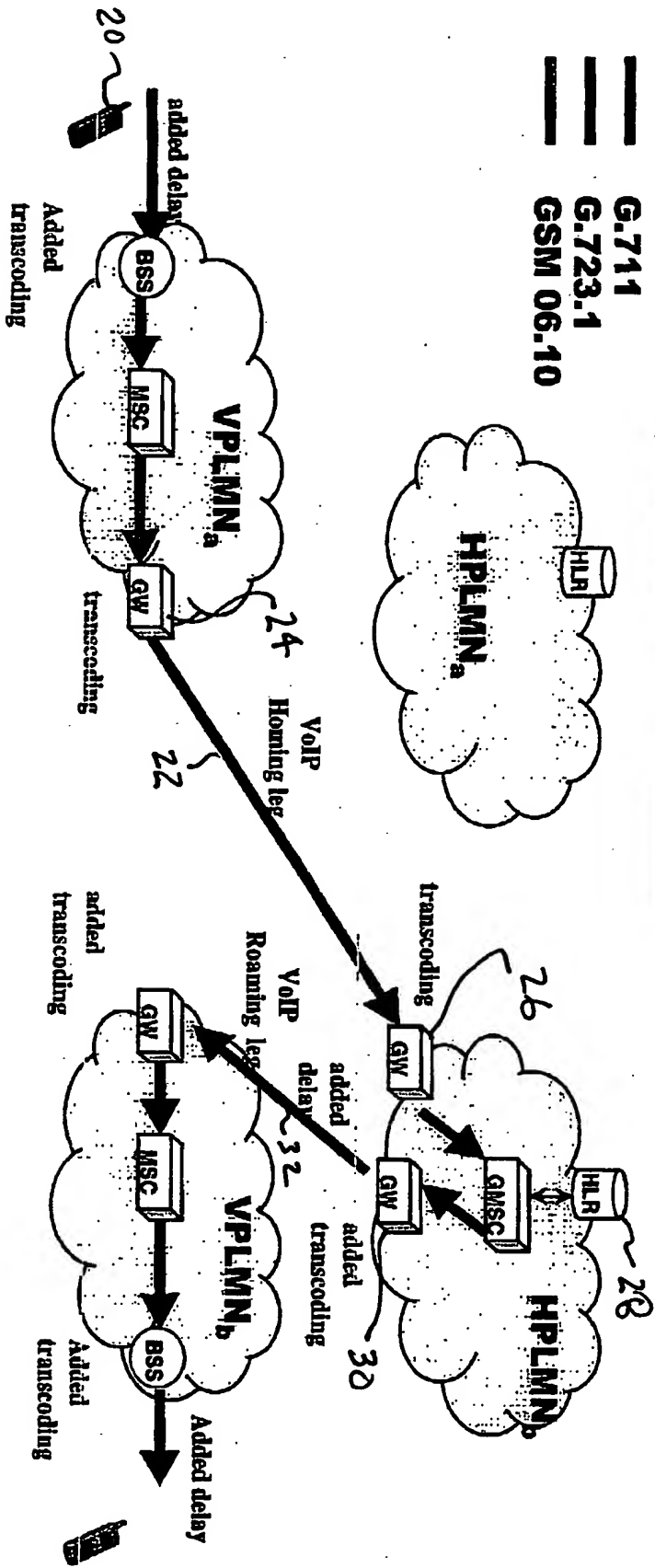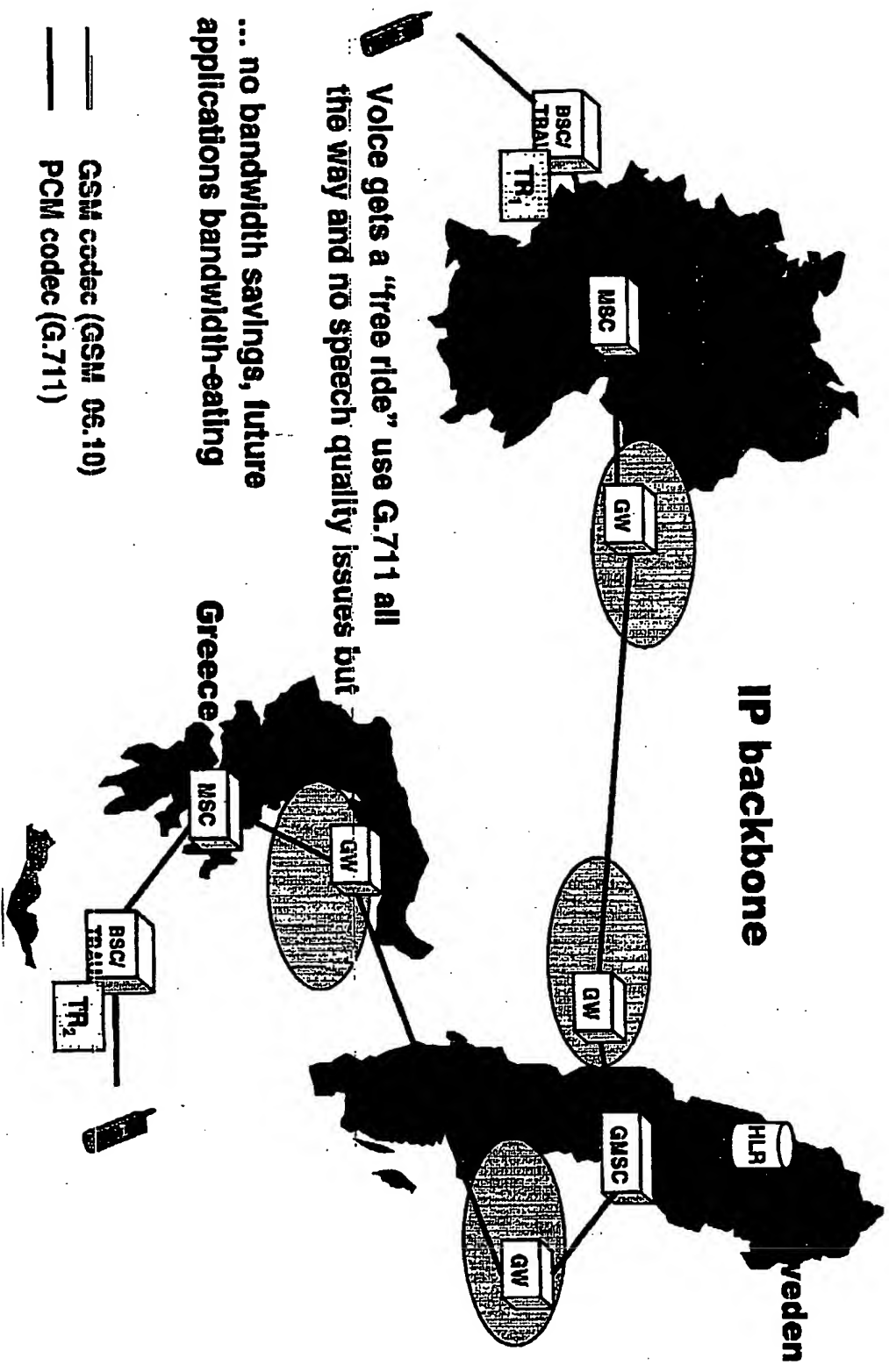
GW
MSC
BSS

added transcoding

Added transcoding

Added delay

Voice gets a "free ride" use G.711 all
the way and no speech quality issues but

... no bandwidth savings, future
applications bandwidth-eating

GSM codec (GSM 06.10)

PCM codec (G.711)

IP backbone
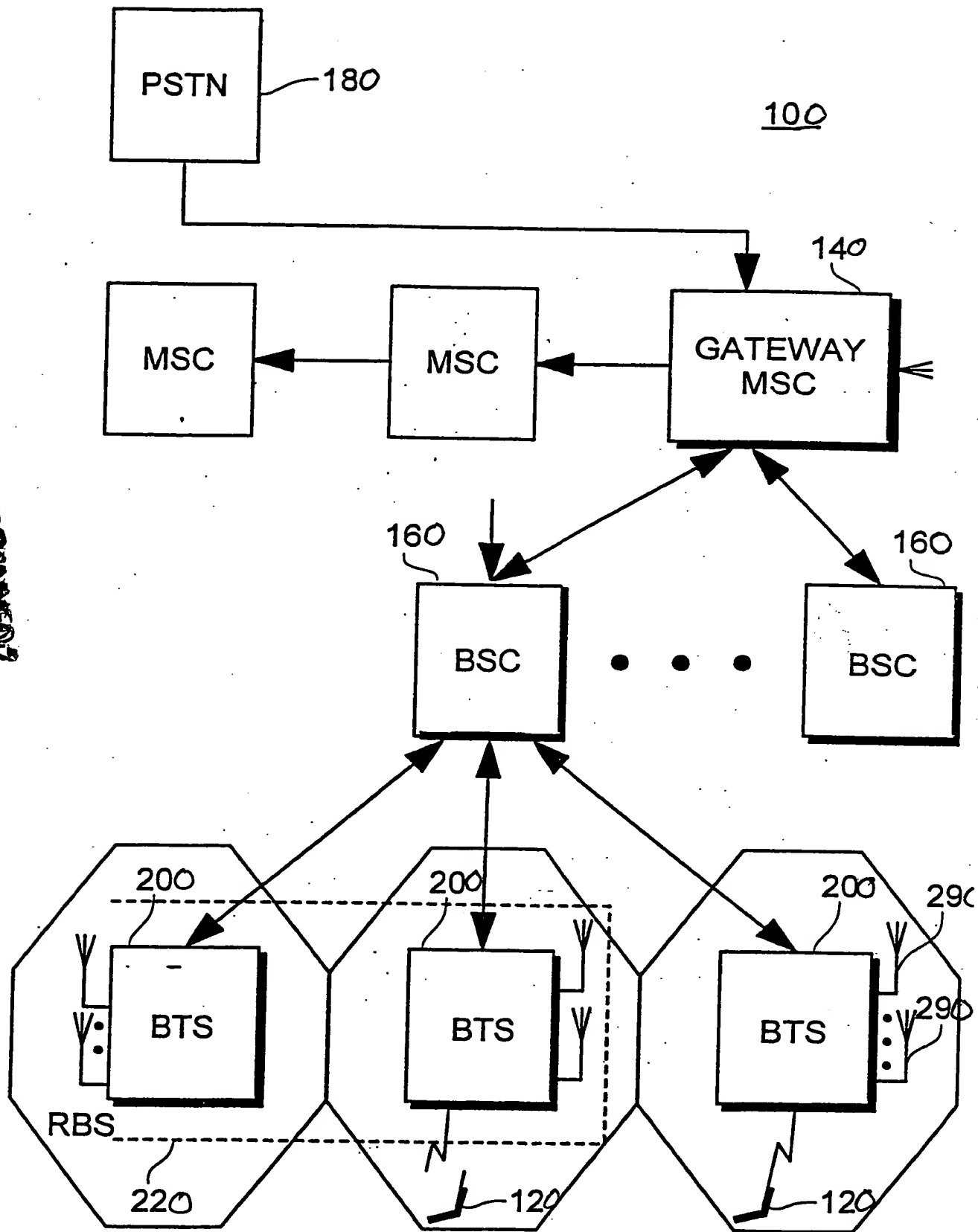
Greece

Sweden
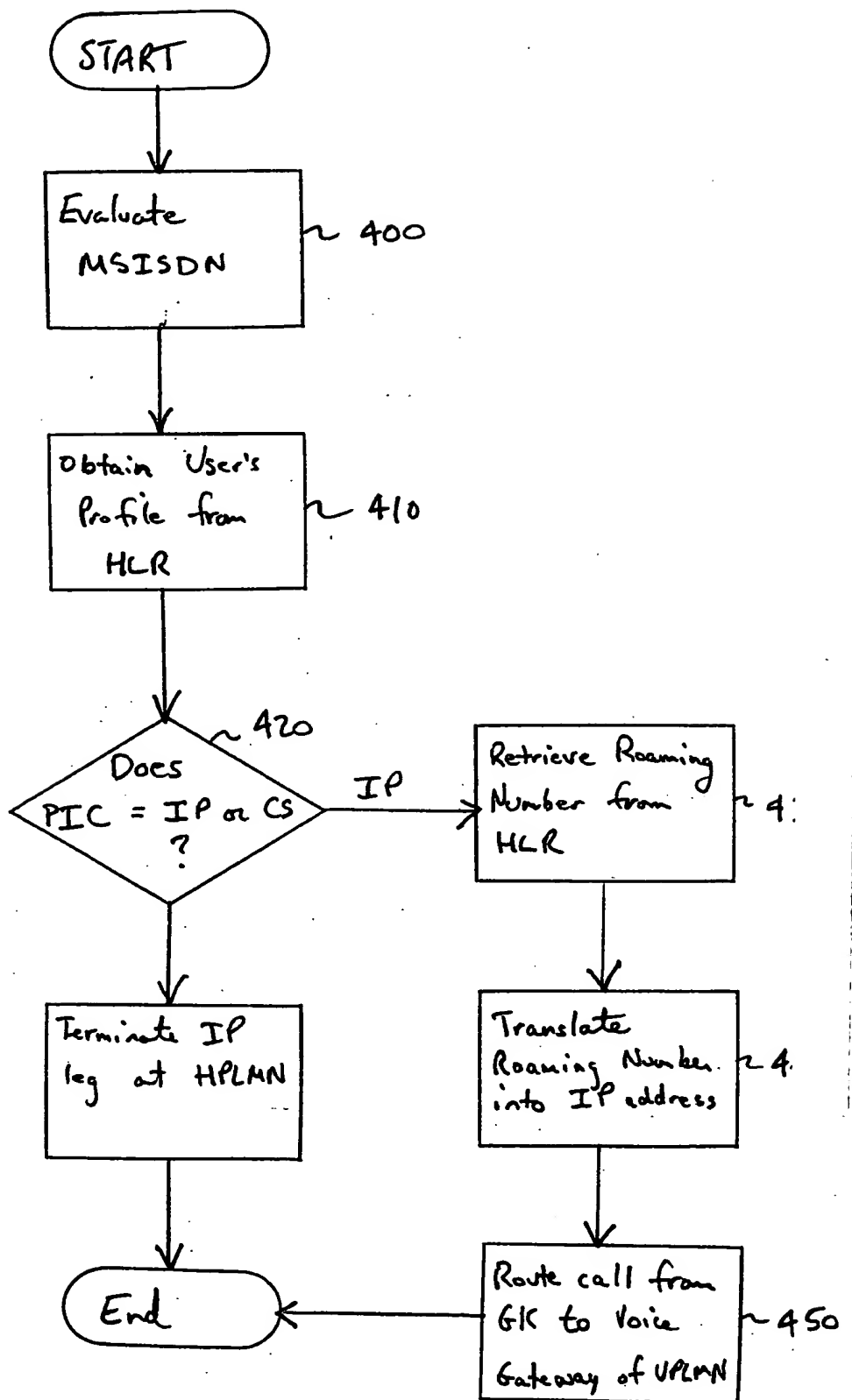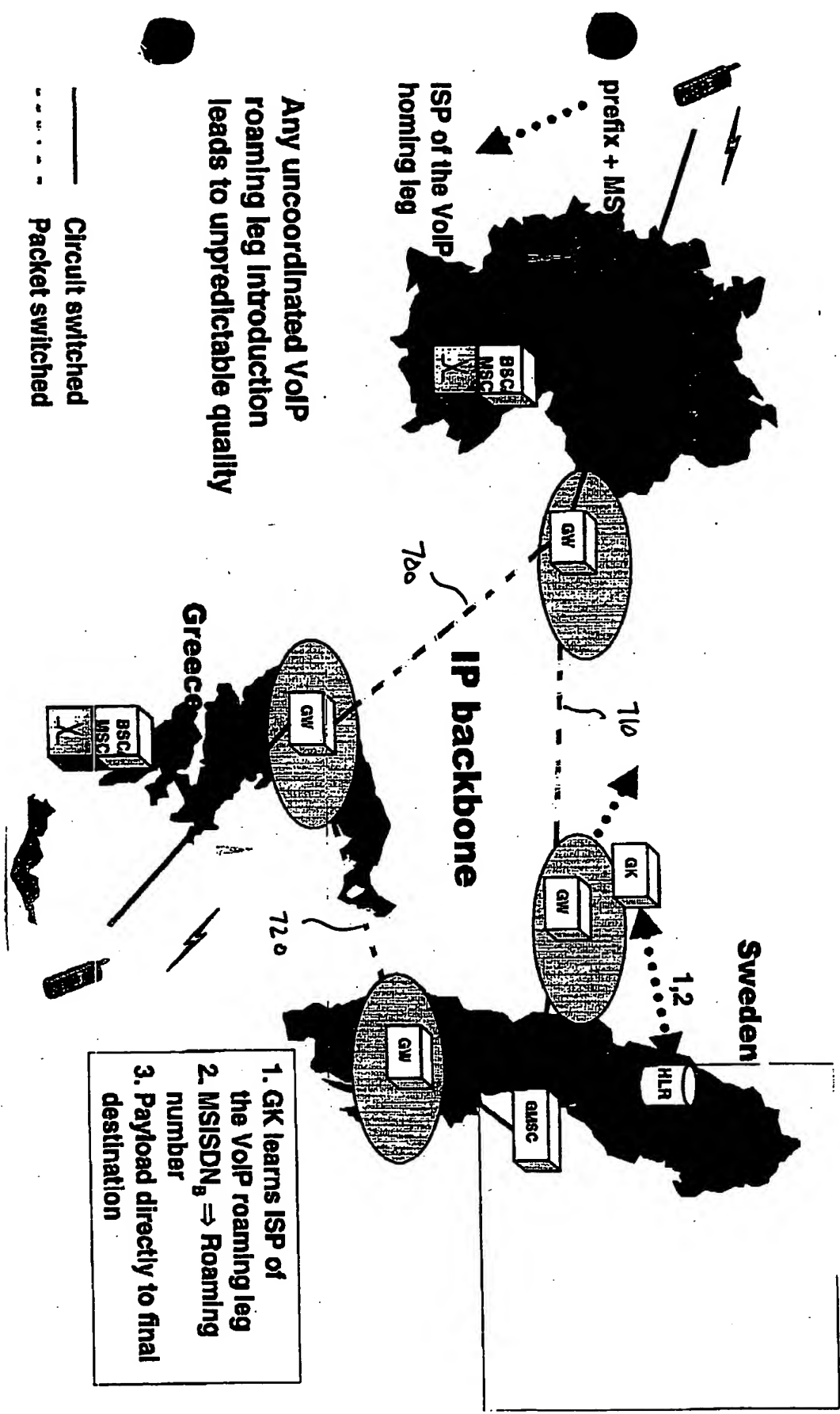
Figure 3

Figure 4

Figure 5

GSM speech
phone

H.323/SIP
mobile laptop

Circuit switched
Packet switched

GSM

HLR

BSC

MSC

300

ISP POP

NAS

VoIP GW

Sig GW

GK

R

310

IP backbone

320

ISP POP

ISDN/PSTN

LE

310

Corporate LAN

R

330

START

Evaluate
MSISDN ~ 400

Obtain User's
Profile from
HLR ~ 410

Does
PIC = IP or CS
? ~ 420

IP → Retrieve Roaming
Number from
HLR ~ 4:

Terminate IP
leg at HPLMN

Translate
Roaming Number
into IP address ~ 4.

End ← Route call from
GK to Voice
Gateway of VPLMN ~ 450

Figure 6

Figure 7

prefix + MS...

ISP of the VoIP homing leg

Any uncoordinated VoIP roaming leg introduction leads to unpredictable quality

——— Circuit switched

· · · · · Packet switched

IP backbone

Greece

700

710

720

Sweden

1,2

GK

GW

HLR

BSC
MSC

GW

GW

GW

BSC
MSC

1. GK learns ISP of the VoIP roaming leg
2. MSISDN$_B$ ⇒ Roaming number
3. Payload directly to final destination

Figure 8

TFO adaption
of GW cs side
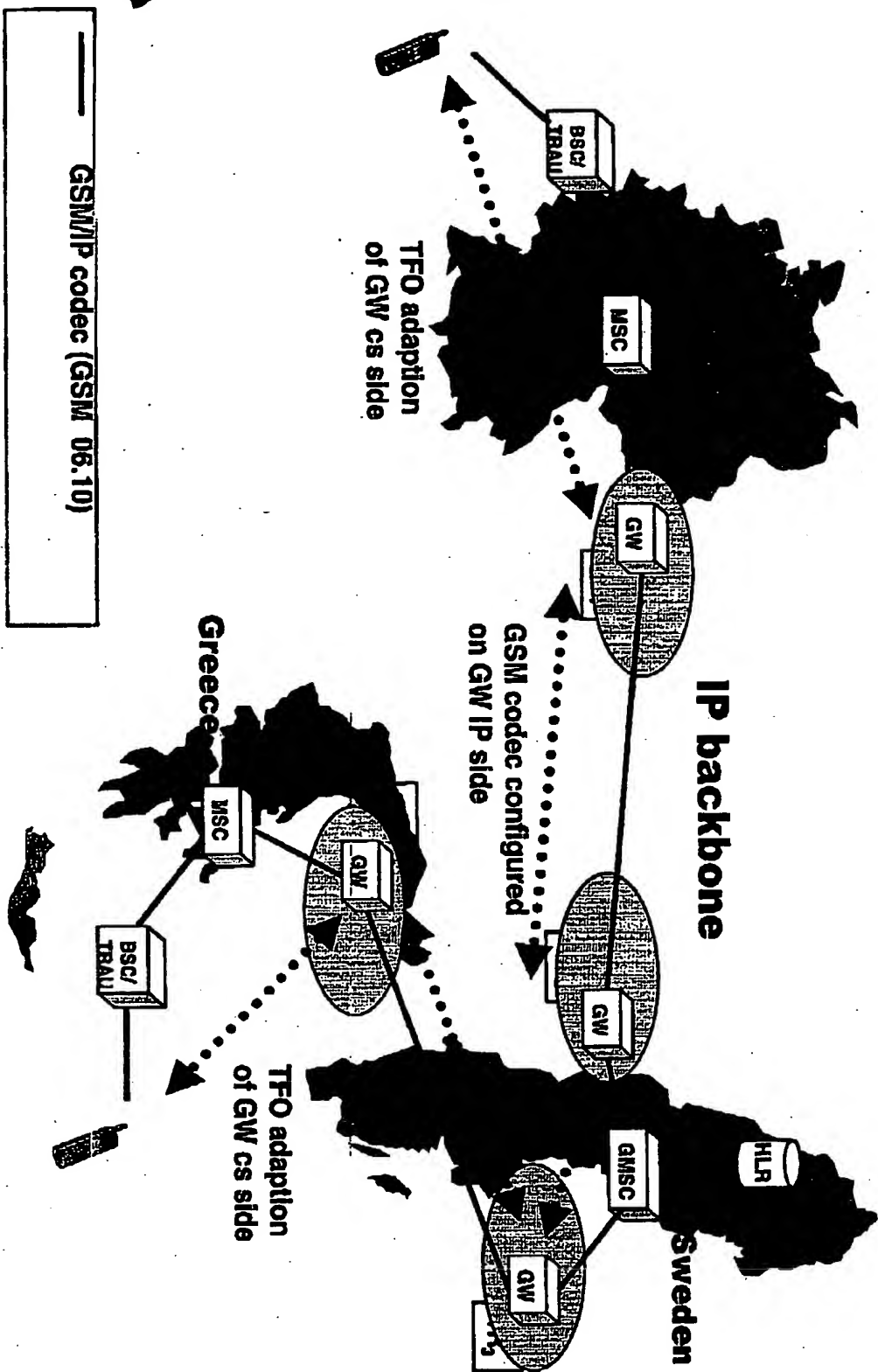
BSC/
TRAU

MSC

GW

IP backbone

GSM codec configured
on GW IP side

GW

GW

Greece

MSC

GW

BSC/
TRAU

TFO adaption
of GW cs side

HLR

GMSC

GW

Sweden

GSM/IP codec (GSM 06.10)